

Conference at Columbia University, June 9 1995
Science - The Endless Frontier: 1945-1995
A renewed contract between academia and government?

[Don Fredrickson -- former dir. NIH; Bill Spenser -- Sematech
Harvey Brooks: has written a lot on science policy]

They will have talked about all the technological wonders that
are payoffs on government investment in science.

Brief presentation by JL on Basic Science.

Notes--

I could use at least 10 of my 20 minutes in reviewing all of the accomplishments of basic
science since WW-2.

Of course any such recitation would heavily overlap the resumes presented by my colleagues
this morning -- especially from health research. In spite of, indeed because of its applied
mission in promoting health, NIH has always given very strong emphasis to the support of
basic investigation. It proved to be rather difficult to devise far-reaching answers to cancer,
when we didn't have the foggiest notion what cancer was, and before that the dynamics of
normal cellular growth.

The most important pathfinder for cancer came from studies on pneumonia, with the
discovery by Avery, Macleod and McCarty that DNA was the core of the genetic material --
and we latterly understand that cancer is a lesion of the cell's DNA.

There are several lessons here:

1) Physics and chemistry had their revolutionary upheavals even before WW-2: this is
symbolized by the crowning event of the war, the atom bomb.

[Discontinuities in physics: quantum mechanics, relativity Nothing comparable in chemistry --
unceasing accumulation of knowledge since 1880's (Kekule, Berzelius)]

2) This came to biology in the postwar period: DNA has overturned everything in biology
and medical science, from its basic roots to its widest applications.

3) The most important discoveries came unbidden, unexpected byproducts of other enquiries.

4) NIH, NSF and so forth showed that research could be fertilized with federal funds, and its
pace greatly accelerated. Always with an uneasy alliance of
academic/commercial/governmental interests, with expected economic payoffs but some,
variable recognition that the best way there is often the long way 'round. (The obvious
straight paths to anything really important have all been exploited long since).

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many byproducts.

1) Scholarship on the defensive -- reliance on instrumental justification. The culture of science has managed to survive, but is under renewed assault: both the pressures and the temptations of the fruits.

That culture is a system of discovery that depends on relentless exposure to nature and to one's colleagues; and for the most radical leaps permission to follow the scientific finding, a discovery versus the project.

2) Counter-reactions from fundamentalist strains, uneasy that scientific advance and technical power are moving too fast:

shifting power to the technocrats from other priest-hoods
 placing unbearable burdens of responsibility for choice life-termination, reproduction,
 as matters of individual option
 erosion of simplistic faiths, and not very much to take its place.

The universities should be the seat of critical examination of all of these issues, starting with the engines of discovery. Increasingly difficult to do when support for science moves from the elicitation of creativity to contracts for performance.

And of course -- partly in wake of eagerness to grow under that rain of fertilizer -- universities are too overextended to be able to do much on their own initiative in maintaining that culture of scientific scholarship. If you doubt it, ask any tenure-aspirant in a science department, and what hope they have if they don't get external funding.